U. S. ARMY
SPECIFICATION

No. 71-914-B
15 October 1943
Superseding
No. 71-914-A of
5 December 1938

RADIO RECEIVERS BC-312-( ) AND BC-342-( )

A. APPLICABLE SPECIFICATIONS AND DRAWINGS.

A-1. Subsidiary Specifications and Drawings. The specifications and drawings listed below form a part of this specification. The issues given in the list shall apply unless otherwise specified in an amendment or in the bid request and contract. Any reference made in other sections of this specification to subsidiary specifications or drawings will omit mention of the issue letters. Lists of specifications and drawings contained either in Section A or in the annex of subsidiary specifications are superseded by the list given herein, for all items procured under this specification.

A-1a. Specifications:

U. S. Army:

71-229-D	Ceramic & Vitric Insulators
71-399-E	Transformers C-62, C-124, and C-205
71-516-E	Capacitors, Fixed
71-852-C	Jacks JK-26, JK-33-A, JK-34-A, and JK-46-A
71-932-B	Transformer C-160
71-945-A	Rectifier RA-20 (And Associated Vacuum Tube)
100-2D	Standard Specification for Marking Shipments (Subsidiary specifications not required)

Signal Corps:

71-1371	Technical Manual
71-1578	Tabular List of Replaceable Parts
71-1588	Manufacturer's Drawings and Specifications
71-1677	Radio and Instrument Hookup Wire

Ordnance Department Tentative:

TAC ES-No. 680b Protective Coating Materials, Synthetic type. (Copies may be obtained from Tank-Automotive Center, Engineering Office, Specification Group, Fisher Building, Detroit, Michigan).

Army-Navy:

JAN-1	Joint Army-Navy Specification for Radio Electron Tubes (Copies may be obtained from Signal Corps Standards Agency, Red Bank, N.J.)

Navy:

RE 13A 372-J	Wire Wound Fixed Resistors (Copies may be obtained from Navy Department, Bureau of Ships)

A-1b. Drawings:

A-1b(1). The following drawings apply to both Radio Receivers BC-312-( ) and BC-342-( ):

RL-D-5035-F	Standard Terminals
RL-D-5340-L	Audio Frequency Transformer, Details
RL-D-5517-F	A-C Bridge Inductance Test Circuits
SC-D-508-L	Audio Frequency Transformers, Assembly & Coil Details
SC-D-512-AE	Capacitors (Fixed, Paper)
SC-D-730-S	Knobs and Handles, Assembly and Details
SC-D-970-X	Resistors (Fixed)
SC-A-1042-N	Toggle Switches
SC-A-1559-A	Knob Stud
SC-A-1728-P	Capacitors
SC-A-1801-B	Neon Lamp
SC-D-1942-K	Relays, Assembly and Details
SC-D-1943-H	Relays, Details
SC-D-1982-X	Potentiometers
SC-D-1995-G	Capacitors (Fixed, Paper)
SC-D-2332-G	Jack JK-33-A, Assembly and Details
SC-D-2333-D	Jack JK-33-A, Details
SC-D-2339-G	Jack JK-34-A, Assembly and Details
SC-D-2340-C	Jack JK-34-A, Details
SC-D-2528-K	General Assembly
SC-D-2529-K	Box, Assembly
SC-D-2530-K	Box, Detail
SC-D-2531-L	Box, Details
SC-D-2532-P	Panel, Assembly
SC-D-2533-N	Panel, Detail
SC-D-2534-N	Panel, Details
SC-D-2535-K	Panel, Details
SC-D-2536-L	Panel, Details
SC-D-2537-H	Panel and Jack Cover Engraving
SC-D-2538-N	Mounting Shelf, Assembly

(2) 17 Aug. 43 150-1-43

SC-D-2539-P	Mounting Shelf, Detail
SC-D-2540-K	Mounting Shelf, Details
SC-D-2541-K	Mounting Shelf, Details
SC-D-2542-K	Mounting Shelf, Details
SC-D-2543-L	Mounting Shelf, Details
SC-D-2544-G	R-F Oscillator Unit Insulation, Assembly and Details
SC-D-2546-M	Capacitor, Dial, Shutter and Switch Mechanism, Details
SC-D-2547-K	Capacitor, Dial, Shutter and Switch Mechanism, Details
SC-D-2548-L	Capacitor, Dial, Shutter and Switch Mechanism, Details
SC-D-2549-N	Capacitor, Dial, Shutter and Switch Mechanism, Details
SC-D-2550-P	Capacitor, Dial, Shutter and Switch Mechanism, Details
SC-D-2551-G	Tube Shelf, Assembly
SC-D-2552-J	Tube Shelf, Details
SC-D-2553-L	1st Detector, 1st and 2nd R-F Units, Assembly
SC-D-2554-F	1st Detector, 1st and 2nd R-F Units, Details
SC-D-2555-G	1st Detector, 1st and 2nd R-F Units, Details
SC-D-2556-H	Oscillator, 1st R-F, 2nd R-F, and 1st Detector Coils, Assemblies
SC-D-2557-E	Oscillator, 1st R-F, 2nd R-F, and 1st Detector Coils, Details
SC-D-2558-K	Oscillator Unit Assembly
SC-D-2559-K	Oscillator Unit, Details
SC-D-2560-H	Oscillator Unit, Details
SC-D-2561-L	C.W. Oscillator Unit, Assembly
SC-D-2562-J	C.W. Oscillator Unit, Details
SC-D-2563-L	C.W. Oscillator Unit, Details
SC-D-2566-M	1st I-F, 2nd I-F, and 1st Det. Transformer, Details
SC-D-2567-H	Transformer and Capacitor Modifications
SC-D-2568-J	Capacitor Unit
SC-D-2569-G	Transformer C-160, Assembly and Details
SC-D-2570-J	Terminal Strips
SC-D-2573-G	Lamp Mounting, Assembly and Details
SC-D-2574-F	Switch SW-119, Assembly and Details
SC-D-2575-E	Capacitor CA-294
SC-D-2577-P	Mounting FT-162, Assembly and Details
SC-D-2578-K	Shielded Binding Post, Assembly and Details
SC-A-2580-G	Capacitor CA-293
SC-D-2592-H	Sockets, Assembly and Details
SC-D-2593-G	Knob, Assembly and Details
SC-D-2738-D	Adjustment and Performance Requirements, Manufacturing Tolerances

* (2) 17 Aug. 43 15 Oct 43

SC-D-2739-A	Adjustment Instructions and Performance Information
SC-D-2740-C	Performance Requirements, Manufacturing Tolerances
SC-D-2972-E	Crystal DC-6-A
SC-D-3715-H	Jack and Control Cover, Assembly and Details
SC-A-3717-C	Diamond Point Swage Tool
SC-D-3856-C	Knob, Assembly and Details
SC-D-4046-A	Gang Switch Sections
SC-A-4081-D	Binding Post, Assembly and Details
SC-D-4166-C	1st I-F, 2nd I-F and 1st Detector Transformer, Assembly
SC-D-4167-D	1st I-F, 2nd I-F and 1st Detector Transformers, Details
SC-D-4168-C	1st I-F, 2nd I-F and 1st Detector Transformers, Details
SC-D-4169-B	1st I-F, 2nd I-F and 1st Detector Coil Units, Assembly and Details
SC-D-5431-C	Capacitor Dial, Shutter and Switch Mechanism Assembly
SC-D-5432-A	Capacitor Dial, Shutter and Switch Mechanism Assembly
SC-D-5433-B	Capacitor Dial, Shutter and Switch Mechanism Details
SC-A-6633-A	Removable Tag
SC-D-9319-A	Example of Illustration for Instruction Books
SC-D-9320-A	Example of Illustration for Instruction Books
SC-D-9321-A	Example of Illustration for Instruction Books
SC-D-9322-A	Example of Illustration for Instruction Books
SC-D-10000-B	Nameplates
SC-D-11359-A	Examples of List of Replaceable Parts

A-1b(2). The following drawings apply only to Radio Receiver BC-312-( ):

SC-D-1866-D	Filter FL-6-( ), Outline and Details
SC-A-1867-C	Dynamotor DM-21-( ), Circuit Label
SC-D-2723-M	Dynamotor DM-21-( ), Outline and Details
SC-D-4083-J	Radio Receiver BC-312-( ), Circuit Label
SC-A-4175-C	Radio Receiver BC-312-( ), Circuit Legend
SC-A-4176-C	Radio Receiver BC-312-( ), Circuit Legend
SC-A-4177-E	Radio Receiver BC-312-( ), Circuit Legend
SC-A-4178-E	Radio Receiver BC-312-( ), Circuit Legend

* (2) 1 Aug. 43 150 ltrs

A-1b(3). The following drawings apply only to Radio Receiver BC-342-( ).

SC-D-1489-D	Choke Coils
SC-A-1490-B	Capacitor CA-329
SC-D-1598-D	Transformer C-228
SC-A-1599-C	Cap for Socket SO-94
SC-A-1608-F	Rectifier RA-20, Circuit Label
SC-D-1609-F	Rectifier RA-20, General Assembly
SC-D-1610-G	Rectifier RA-20, Box Assembly and Details
SC-D-1611-H	Rectifier RA-20, Box Details
SC-D-1612-G	Rectifier RA-20, Mounting Plate, Assembly
SC-D-1613-F	Rectifier RA-20, Mounting Plate, Details
SC-D-4084-H	Radio Receiver BC-342-( ), Circuit Label
SC-A-4180-B	Radio Receiver BC-342-( ), Circuit Legend
SC-A-4181-B	Radio Receiver BC-342-( ), Circuit Legend
SC-A-4182-D	Radio Receiver BC-342-( ), Circuit Legend
SC-A-4183-C	Radio Receiver BC-342-( ), Circuit Legend
SC-A-4184-B	Radio Receiver BC-342-( ), Circuit Legend

A-1c. Commercial Standards. The commercial standards listed herein and in subsidiary specifications, as well as all subsidiaries to these standards, form a part of this specification but will not be furnished by the Government. The contractor may, at his option, use the issue of the commercial standards in effect on the date of invitation for bids in lieu of the issue given herein.

ASA C8.7-1936	Enameled Round Copper Magnet Wire
ASA C75.3-1942	Mica-Dielectric Capacitors (Fixed)
NEMA 39-57	Laminated Phenolic Products

B. TYPES

B-1. Types. This specification covers the two types of radio receivers listed below. The parentheses in the nomenclature should be replaced (on nameplates, etc.) by a code letter identifying the particular design; for example, Radio Receiver BC-312-Y. The code letter will be furnished to the contractor upon his application to the contracting officer, after each contract has been awarded.

Type	Frequency Range (kc)
Radio Receiver BC-312-( )	1500 - 18000
Radio Receiver BC-342-( )	1500 - 18000

(2)/1 Aug. 43 150-43

B-2. Description. The radio receivers are of the multi-band, integral coil, superheterodyne type intended for field, permanent-station and vehicular use, and provide reception of "CW" or "voice" signals. Radio Receiver BC-312-( ) is operated from a d-c power source of 11-15 volts, and includes Dynamotor DM-21-( ) for supplying the plate and screen voltages. Radio Receiver BC-342-( ) is operated from a 60-cycle a-c power source of 110-120 volts and includes Rectifier RA-20.

C. MATERIAL AND WORKMANSHIP

C-1. Material. The material for each part shall be as specified herein. The best material for tropical and arctic use commercially available for the purpose shall be used when a definite material is not designated.

C-1a. Aluminum Alloy. The use of aluminum shall be avoided except where allowed by the contracting officer in writing. Where aluminum is specified on the drawings, the contractor shall substitute a suitable, more available metal. The thickness of the substitute metal shall be such that the finished receiver is as light as possible and the part will have at least as much rigidity and stiffness as the required aluminum part. Where aluminum must be used, it shall be the proper alloy and hardness to provide the necessary strength and rigidity for the particular application. Alloys requiring heat treatment are particularly to be avoided.

C-1a(1). Where no substitution can be made for aluminum die castings, only secondary or reclaimed aluminum shall be used.

C-1b. Nickel Silver. Nickel silver may be replaced by suitably plated brass or stainless steel.

C-1c. Laminated Phenolic. All laminated phenolic shall be dense and homogeneous in structure, of the proper grade for its intended use, and in accordance with NEMA Standard No. 39-57. Unless otherwise specified on the drawings, natural color phenolic may be used except on exterior surfaces, where the color of the phenolic shall match that of the surrounding surface. All laminated tubing shall be seamless, "rolled," not "molded," and shall be capable of being machined without rough edges or breaking of threads. Where not machined, all laminated phenolic materials shall have the original smooth or polished surfaces, except where objectionable glare makes a dull surface more desirable. All sawing and machining shall result in a smooth surface.

C-1d. Molded Phenolic Compounds. Molded phenolic compounds shall be selected with respect to the electrical, mechanical and other properties required by the part. The compounds shall be the best commercially available for the purpose intended.

(2) 17 Aug. 43 15 Oct 43

C-1e. Insulation Material. Insulation material which will support rapid combustion shall not be used. The use of inflammable varnish is prohibited. All insulation material, except wire insulation, shall be mechanically rigid under all specified operating temperatures and shall be free from cold-flow effects.

C-1f. Ceramic Insulation. Where highest grade steatite is required, ceramic insulation shall be Grade G, per Specification No. 71-229, unglazed and waxed. A mica filler vitric equivalent to Micalex as manufactured by General Electric Company, Schenectady, N. Y., is also approved for radio-frequency insulation. When screws are used in tapped holes in ceramic material, each screw shall be secured with a corrosion-resisting lock-washer. Where the type of construction is such that the use of lockwashers is not feasible, all screws shall be secured by the use of litharge or No. 1153 Glyptal, as manufactured by General Electric Company, Schenectady, N. Y., or equal. Insulators mounted on metallic surfaces shall be cushioned by fish paper, cork, or lead gaskets. Lead gaskets are satisfactory for padding material between ceramic insulators and metal, or between two pieces of ceramic material.

C-1g. Screws, Nuts and Washers. All screws and nuts shall have the American National form of thread and wherever practicable shall be commercial standard size and threads per inch. All screws, nuts, and washers shall be of corrosion-resistant material or suitably protected against corrosion by zinc or silver-plating, or other acceptable means. Where exposed to view, they shall have painted, oxidized, dull-white or other low-reflecting finishes.

C-1h. Solder.

C-1h(1). Tin Content. Unless specific approval for the use of low-tin solders is granted by the contracting officer, the solder used shall have a tin content of not less than 38 per cent by weight.

C-1h(2). Impurities. The individual amount of elements other than tin and lead contained in the solder shall not exceed the following percentages:

Antimony	0.40	Zinc	0.005
Bismuth	0.25	Aluminum	0.005
Copper	0.08	Total other elements	0.08
Iron	0.02		

The total amount of the above impurities shall not exceed 0.5 per cent.

C-1h(3). Flux-Cored Solder. Flux-cored solder, if used, shall have a rosin core. The rosin shall be grade "WW" (water white) or better.

C-1i. Strategic or Scarce Materials or Articles. In order to expedite procurement, the use of strategic or scarce materials or articles shall be avoided wherever possible without seriously impairing performance or durability of the finished product. Where strategic or scrace materials or articles are specified, the contractor shall apply to the contracting officer for approval of any proposed substitute.

C-1j. Substitutions for Specified Products. If the bidder desires to substitute another material or fabricated part in those cases where the specification or drawings call for the product of a specific manufacturer, "or equal," he shall submit a statement to that effect with his bid describing the proposed substitutions, and shall submit data that will substantiate his claims that such substitutes are the equal of those specified. At the discretion of the contracting officer, samples may be required which will demonstrate by test the suitability of the proposed substitute.

C-2. Workmanship. All parts shall be manufactured and finished in a thoroughly workmanlike manner, and in accordance with the best commercial practice for tropical and arctic use. All dimensions, except where tolerances are given on the drawings, shall be held as close as is consistent with good shop practice. All parts shall fit in a good, workmanlike manner. Panel machining and drilling shall be done using accurate templets or jigs.

C-2a. Securing of Screws and Nuts. Except as noted below, all screws and nuts shall be secured by staking so as not to become loosened when subjected to severe vibrations. Staking shall consist of placing two center-punch marks on the thread of the screw and nut or in upsetting the ends of small screws. Wherever necessary, a corrosion-resistant lockwasher shall be used in addition to staking. Where staking is impracticable, screws and nuts shall be secured by the use of lockwashers, or elastic stopnuts as made by the Elastic Stopnut Company, Union, N. J., or equal, Staking shall not be used in the following cases:

a. Where impracticable because of the size of thread or design and construction.
b. Where staking would prevent removal of parts for repair or replacement.
c. Where nuts secure connections to meter studs.

C-2b. Soldering. All soldering shall be done neatly using no flux other than rosin or rosin and alcohol. Wherever practicable, the excess flux shall be removed with alcohol or other suitable solvent after soldering. Solder shall not have crystallized, been inadequately heated, or overheated. Sharp points or rough surfaces resulting from overheating will not be acceptable. The applied solder shall feather out to a thin edge, indicating proper flowing and wetting action. Where insulating material is subjected to heating during the soldering operation, it shall be undamaged, and parts fastened thereto shall not become loosened. Where the materials to be soldered are such as to make the use of rosin and alcohol impracticable, the contractor shall secure permission of the contracting officer before using alternate fluxes and cleaning agents. Any flux other than rosin shall be chemically neutralized and removed.

C2 17 Aug. 43 15 Oct. 43

D. GENERAL REQUIREMENTS

D-1. First Samples of Production. Subject to the provisions of the bid request and contract, the following requirements for samples shall apply. (Requirements for samples contained in subsidiary specifications are superseded by the requirements given herein, when the items covered by the subsidiary specifications are procured as parts of the equipment covered by this specification).

D-1a. After award of contract, the contractor shall assemble two sample Radio Receivers BC-312-( ) and BC-342-( ), using the tools and methods which will be used in quantity production. These samples together with test data showing complete compliance with this specification shall be submitted for approval.

D-1b. Together with or prior to the submission of the sample radio receivers, the contractor shall submit for approval samples of the parts listed below. Separate sets of samples shall be submitted for each type of the listed parts. (Parts will be considered to be of the same type if they are made by the same manufacturer and have the same physical construction and dimensions, even though they differ from each other in their electrical values). Sample parts are required only if the contractor wishes to furnish parts of a make different from that specified on the drawings or where no definite make is specified. Approval of the sample parts will be tentative and contingent upon their satisfactory operation in the assembled equipment.

LIST OF PARTS TO BE SUBMITTED

PART	QUANTITY	SPEC. OR DRAWINGS
Resistors	6	Par. D-4, Spec. 71-914
Potentiometers	6	SC-D-1982
Variable Capacitors	1	SC-A-1728, SC-D-2568
Grid Caps	6	Par. E-9, Spec. 71-914
Switches	1	SC-A-1042, SC-D-2574 and items 51 and 52 of SC-D-2553
Tube Sockets	3	Par. E-8, Spec. 71-914
I-F Transformers	1	SC-D-4166

* (6) 17 Aug 43 150-448

LIST OF PARTS TO BE SUBMITTED (Cont'd.)

PART	QUANTITY	SPEC. OR DRAWINGS
# R-F Transformers	1	SC-D-2553
Relays	1	SC-D-1942
# Rectifier RA-20	1	Spec. 71-945
# Formed Box with Brackets for Rectifier RA-20	1	SC-D-1609
## Dynamotor DM-21-( )	1	SC-D-2723
## Formed Case with Mounting Brackets for Dynamotor DM-21-( )	1	SC-D-2723
# Transformer C-228	2	SC-D-1598
# Coil C-227	3	SC-D-1489
# Capacitor CA-329	2	SC-A-1490
Gages		Pars. E-12 and F-3, Spec. 71-914

\# Component part of Radio Receiver BC-342-( ) only
\## Component part of Radio Receiver BC-312-( ) only

D-1c. If any of the samples are disapproved, the contractor will be required to furnish additional samples until satisfactory samples have been submitted. Such additional samples shall be accompanied by a description of the changes which have been incorporated in the new samples in order to correct the faults of the rejected samples. When approved, the sample radio receivers and component parts will be returned to the contractor, and one of the radio receivers will be marked for use by the inspector as a standard of workmanship. Approval of the submitted samples shall not be construed as authorizing any deviation from the requirements of this specification.

D-2. Facsimile of Circuit Label and Nameplates. Before printing the circuit label (Paragraph D-22) or manufacturing the nameplates (Paragraph D-21) the contractor shall submit facsimiles of the circuit label and facsimiles of the nameplates to the designated inspection agency for approval.

D-3. Fixed Capacitors. Fixed mica-dielectric capacitors shall be in accordance with ASA Standard C75.3. Fixed paper-dielectric capacitors shall be in accordance with the applicable requirements of Specification 71-516 and Drawing SC-D-512. The maximum peak voltage applied on any of the fixed paper or mica-dielectric capacitors shall not exceed the manufacturer's working voltage rating of that capacitor. The normal working voltage applied on any fixed capacitor shall not exceed 75 per cent of the manufacturer's voltage rating.

(C) 17 Aug 43 150ct43

D-3a. Due to the scarcity of mica, no mica capacitors shall be used without the written permission of the contracting officer.

D-4. Fixed Resistors. All fixed resistors shall be of the insulated type. Wire-wound resistors shall be in accordance with Navy Specification RE 13A 372 for Class 2, Grade 1. (However, marking, packing and qualification test of the Navy Specification do not apply). Other fixed resistors shall comply with the applicable performance requirements of Drawing SC-D-970 and where applicable also with the dimensional requirements. All resistors shall have their resistance values plainly and legibly marked on them or as an alternative they may be color-coded in accordance with the Standard Resistor Color Code of the Radio Manufacturer's Association. All fixed resistors shall be capable of dissipating without damage to themselves, or any other part of the equipment, at least 50 per cent more power than the maximum which they will dissipate in normal use of the equipment.

D-5. Transformers, Coils, Etc. (Power and Audio Frequency). All transformers and coils which carry direct current shall be designed to carry, without damage to themselves or any other part of the equipment, at least 25 per cent more direct current than the maximum they will carry in the normal use of the equipment. All transformers and coils shall be so designed that, when in their place in the equipment, they will safely handle their required power and peak voltage without damage to themselves or any other part of the equipment. All transformers and coils shall be capable of withstanding a one-minute application of an a-c voltage (with frequency not greater than 100 cps) with an rms value equal to four times the normal operating d-c voltage between any two windings or any winding and metal parts or ground. However, if the operating voltage is greater than 500 volts, the test voltage shall be 1000 volts greater than twice the operating voltage.

D-5a. Potting. All transformers and coils shall be potted. Sufficient compound shall be used during pouring to completely fill the case. Immediately after filling, the case shall be sealed. The process shall be so carried out that no air bubbles shall be formed on any surface of the windings or wiring.

D-6. Safety. Satisfactory provision shall be made in all parts of the equipment to prevent operating personnel from accidentally coming in contact with potentials in excess of 30 volts when the equipment is complete and in normal operating position.

* (6) 17 Jan 43 - 15 Oct 43

D-7. Ruggedness and Reliability. The maximum of ruggedness and reliability under all operating conditions is of primary importance in the use of this equipment. All parts and details of construction shall be chosen with this requirement in mind. The equipment shall withstand long periods of service and repeated rough handling in transportation, with a minimum of damage and a minimum of readjustment.

D-8. Interchangeability. All parts of each equipment, such as variable or fixed capacitors, transformers, and resistors, shall be mechanically and electrically interchangeable with corresponding parts of any other equipment on the order.

D-9. Ease of Adjustments. All controls shall operate easily and smoothly without excessive motion, binding, scraping, or cutting. All switches shall have a positive mechanical index at each position, so as to require no searching for contact by the operator. A small amount of lubricant (graphite or equivalent) may be applied if it does not interfere with operation.

D-10. Wiring.

D-10a. All wiring shall be neat, sturdy and as short as possible. Insulated wiring shall be suitably supported and arranged by bunching and lacing with impregnated twine or other suitable means in order to prevent breakage and to minimize changes in operating conditions.

D-10b. All wires shall be securely fastened at their terminations by crimping the terminals firmly upon the wire, including insulation wherever practicable, or by crimping or wrapping the wires upon the terminals or by other equally effective means so as not to depend upon solder for mechanical strength. All textile insulation ends not securely clamped by terminals shall be lacquered or otherwise treated where necessary to prevent fraying.

D-10c. Color Coding. The wiring shall be color coded as follows:

R-F plate leads - blue, or white with blue tracer, solid
Grid return leads - green, or white with green tracer, solid
Grid leads (all other) - green, stranded
AVC wiring - yellow, or white with yellow tracer, solid
D-C plate leads - red, solid
Screen grid leads - maroon, or white with maroon tracer, solid
Heater leads - black, solid
Cathode leads - brown, solid

16 17 Aug 43 15 Oct 43

D-10d. Arrangement of Wiring. All wires connecting like components in like receivers shall be arranged identically. Wherever a group of leads are harnessed, the arrangement within the harness shall be identical in every respect in each receiver.

D-11. Type of Hookup-Wire. All hookup wire shall be in accordance with Specification No. 71-1677. The wire shall be stranded, and shall be sufficiently large for the current carrying requirements of the circuit.

D-12. Enameled Wire. All enameled wire used shall conform to A.S.A. Standard C8.7.

D-13. Wire for Special Application. Dynamotor power leads and all jack leads shall be 1620 circular mils (#18 AWG) stranded, coated, and insulated as per Paragraph D-11 and equipped with 1/8" shielding terminated with eyelets.

D-13a. Wherever rigid wire is necessary to prevent frequency shift upon vibration, 1620 circular mils (#18 AWG) prestretched, solid wire, lead or lead-tin alloy coated, (20% tin maximum), shall be used.

D-13b. All wires entering or leaving the tube shelf and CW oscillator shall be 1620 circular mils (#18 AWG) stranded, coated, and insulated as per Paragraph D-11.

D-13c. Shielding. Shielding shall be 1/8" in diameter, terminated and soldered to eyelets at both ends.

D-14. Ground Connections.

D-14a. All shielding which is placed over wires shall be connected to a common ground bus.

D-14b. The chassis, shield or other parts of the set shall not be used as a conductor to complete electrical circuits, but only to insure the elimination of r-f high-potential points.

D-15. Grounding of Capacitors. Wherever multiple-section capacitors are used for by-passing, the common return of the capacitor shall be connected to the ground return of the circuit in question by means of a wire soldered to a terminal which is held by one or more mounting screws of the capacitor. Each wiper arm associated with a section of the gang variable condenser shall be connected by means of an insulated lead to the ground lead of the corresponding r-f coil box. The ground terminals of all the r-f coils shall be connected to a common ground.

D-16. Cleaning. The box, chassis, and wired parts shall be thoroughly cleaned and shall be free from superfluous particles of solder and all foreign material.

D-17. Finish. Finish shall be as required herein. Cadmium plating shall not be used on the receiver nor on any of its component parts except where cadmium-plated parts are the only ones commercially available, in which case the cadmium plating shall be covered with one coat of clear lacquer. Wherever metal surfaces are to be in contact or are to be joined mechanically to each other, both surfaces shall be clean and free from lacquer.

D-17a. Brass, Bronze, Copper or Beryllium Copper Parts. All brass, bronze, copper or beryllium copper parts not exposed to the elements shall have all surfaces protected by silver or other white plated finish, unless otherwise specified herein. Switch contacts shall be silver plated. The leads or lugs of parts to which soldered connections are made shall be either lead alloy coated or silver plated. All brass, bronze, copper or beryllium copper parts exposed to the elements shall have all surfaces chemically etched and painted.

D-17b. Iron and Steel Parts. Iron and steel parts not exposed to the elements shall have all surfaces suitably protected against corrosion by adequate plating. All iron and steel parts exposed to the elements shall be suitably protected against corrosion by having all surfaces parkerized, bonderized, or treated by an approved equivalent method, and painted unless they are made of stainless steel in which case they shall be sandblasted or chemically etched and painted.

D-18. Plating. The plating of the rectifier box and the dynamotor case shall be capable of withstanding the saltwater immersion test described in Paragraph F-6.

D-19. Painting. After suitable surface preparation, equipment shall be painted as required herein. All paint materials, unless otherwise specified or allowed, shall be in accordance with Ordnance Specification TAC ES-No. 680. Wherever subsidiary drawings call for painting in accordance with Quartermaster Specification HQD ES-No. 680 or Ordnance Specification HOMB ES-No. 680, Specification TAC ES-No. 680 shall apply instead. The contractor shall submit satisfactory evidence that paints of the type and make used on the order have been tested and found to comply with Specification TAC ES-No. 680.

D-20. Marking of Component Parts. The circuit symbol by which the part is designated on the circuit label shall be marked, wherever practicable, on a surface adjacent to the part and on the part itself. Where space permits, the part shall also be marked with the Signal Corps type number (where type number has been assigned), value and rating, manufacturer's catalog number and name or trademark, contractor's part number, and other pertinent information, preference being in the order given. The marking shall be legible and permanent, and shall be visible when covers are removed. Marking shall be done by molding or engraving, paint, decalcomania, or paper labels securely applied with waterproof cement. A coat of clear lacquer shall be applied over the marking. If impracticable to mark resistors or capacitors, they may be color-coded in accordance with the Radio Manufacturer's Association standard color code.

D-20a. Marking of Vacuum Tube Designation. The JAN designation (except the manufacturer's code letters) and the Signal Corps type number (if assigned) of each vacuum tube shall be marked on a surface adjacent to the corresponding tube socket, for example: JAN 6C5,VT-65. Marking of the circuit symbol of the tube is not required. The tube sockets themselves shall not be marked.

D-21. Nameplate. A nameplate of suitable size, made in accordance with Drawing SC-D-10000, shall be mounted on each radio receiver.

D-22. Circuit Label. A circuit label diagram shall be mounted inside each receiver and located where it is readily visible when the unit is opened for servicing. The circuit label shall be in Gothic type, and shall either be photolithographed on a suitable plate and protected by a coat of clear lacquer, or printed on Graphic Lamicoid as made by the Mica Insulator Company, New York, N. Y., or equal.

6 17 Aug 43 15 Oct 43

E. DETAIL REQUIREMENTS

E-1. Construction. Except as modified by this specification, all construction shall be in accordance with the specifications and drawings listed in Section A and shall be such as to meet the tests referred to in Section F.

E-2. Coil Winding and Construction. All winding data given on the drawings are approximate. The contractor may, if necessary, vary the number of turns on the coils and the position of the taps in order to obtain the required performance. In order to simplify the manufacture of the coils, the contractor may provide for fine adjustment of the inductance by means of a small loop of wire on the end of the windings inside the coil forms, by variation of the position of the end turns of the coil, or by other means, provided such adjustments are made in such a way that the coil inductance will not vary over long periods of hard service and that the performance of the radio receiver is not affected.

E-3. Performance and Adjustment Requirements. Performance requirements and manufacturing tolerances are specified on Drawings SC-D-2738 and SC-D-2740. Drawing SC-D-2738 also lists adjustment requirements. Performance information and adjustment instructions are given on Drawing SC-D-2739. The data contained on the last-named drawing are given for the information of the contractor and do not constitute manufacturing requirements.

E-4. Mechanical Operation. Rotation of the tuning drive through any frequency band or turning of any other control shall not cause any noise in the output of the receiver under any condition of operation. Vibration of the receiver shall not cause the c-w note to flutter as a result of improper mounting of fastening of parts, insufficient removal of lacquer (see paragraph D-17), or poor workmanship in general. Tapping of the radio receiver shall not cause noise peaks extending considerably above the average noise level of the set. The test for compliance with this requirement shall be made with the radio receiver in a sensitive condition and the cw oscillator turned off.

E-5. Output Impedance. The open circuit of Radio Receivers BC-312-( ) and BC-342-( ) shall be designed to provide two output impedances; one of 250 ohms, the other of 4000 ohms. The receivers shall be wired to have the output impedance specified in the contract, but it shall be possible for field personnel to select either one of the impedances by a simple change in wiring. A reversible tag shall be mounted on or near each output jack to indicate the impedance for which the set is wired. Wherever possible, this tag shall be per Drawing SC-A-6633.

(2)17 Aug. 43 15 Oct 43

E-6. Vacuum Tubes. Unless otherwise specified on the order, the contractor shall furnish one set of tubes for each radio receiver ordered. Each set shall consist of the following tubes:

	2 Tubes	6C5	(VT-65)
	1 Tube	6F6	(VT-66)
	4 Tubes	6K7-GT	(VT-86)
	1 Tube	6L7	(VT-87)
	1 Tube	6R7	(VT-88)
*	1 Tube	5W4	(VT-97)

* For Radio Receiver BC-342-( ) only.

E-7. All vacuum tubes used shall be in accordance with Joint Army-Navy Specification JAN-1, and shall have received "Type Approval" for the particular tube manufacturers involved. The specified performance shall be obtained with tubes meeting and operating at the minimum limits and ratings set forth in the JAN-1 specification.

E-8. Tube Sockets. Material and design of tube sockets shall be per Drawing SC-D-2551.

E-9. Grid Caps. Grid caps shall be type 8, as made by the National Company, Inc., Malden, Mass., or equal, except that they shall be reduced to 1/4 inch and shall be tapered at the end at an angle of 30 degrees to avoid shorting against the shell of the tube.

E-10. Spare Parts. The following spare parts shall be provided with each radio receiver:

Radio Receiver BC-312-( )

2 sets	Brushes with holder springs for Dynamotor DM-21-( )
4	Fuses FU-21-A
2	Lamps LM-27

Radio Receiver BC-342-( )

1	Fuse FU-27 for Rectifier RA-20
4	Fuses FU-21-A
2	Lamps LM-27

The spare parts listed above shall be contained in a bag attached to the respective radio receiver.

(2) 17 Aug. 43 150-443

E-11. Mounting FT-162. Each radio receiver shall include one Mounting FT-162 per Drawing SC-D-2577.

E-12. Gages. The contractor shall provide all gages necessary for inspection of equipment on order. The gages shall be made of durable steel dimensioned to insure rejection of any part whose dimensions are not within the tolerances given on the drawings. The contractor shall submit, together with sample equipment, required by Paragraph D-1, a certificate from a gage laboratory stating that the gages have been checked and found satisfactory for the purpose intended.

E-13. Technical Manuals. Two copies of technical manuals in accordance with Specification No. 71-1371 shall be furnished with each radio receiver on order. Additional copies to be furnished to the Office of the Chief Signal Officer, Washington, D. C., will be required in the bid request and contract.

E-14. Manufacturer's Drawings and Specifications. The contractor shall furnish complete sets of manufacturers' drawings and specifications in accordance with Specification No. 71-1588, in the quantities and to the destinations specified on the bid request and contract.

F. METHOD OF INSPECTION AND TESTS

F-1. Test and Test Equipment. Radio Receivers BC-312-( ) and BC-342-( ) and all material entering into the fabrication thereof shall be subject to inspection by the authorized Government inspector. The contractor shall furnish all necessary facilities and equipment for making the tests and inspection required by this specification and shall carry out all the tests under the supervision of the inspector. The test equipment shall be adequate in quantity to avoid delay during inspection. The contracting officer reserves the right to make other tests not specifically described herein when such tests are deemed necessary to determine full compliance with the specification requirements. The contractor shall correct all deviations from this specification pointed out by the inspector.

F-2. Component Parts. The contractor shall test all component parts before their installation in the equipment. Component parts covered by subsidiary specifications (such as resistors, capacitors, etc.,) shall be inspected in accordance with such specifications before their installation in the equipment. Component parts not covered by subsidiary specifications shall be inspected to ascertain that they meet all requirements of this specification and that they operate satisfactorily in the assembled equipment.

12 17 Aug. 43 15 Oct 43

F-3. Test Equipment. The following test equipment will be required:

a. A doubly shielded screen room with r-f filtered, d-c or a-c power supply (whichever may be necessary)

b. An adequate number of cords equipped either with plugs to fit Socket SO-94 in Radio Receiver BC-312-( ) or with sockets to fit the plug in Rectifier RA-20, (whichever is necessary)

c. Standard Signal Generator, Ferris Instrument Co., Model 16-B, or equal

d. Output Power Meters, General Radio Co., type 583-A, or equal

e. Microvolter, Ferris Instrument Co., Model 10-B, or equal

f. Random Noise Generator as per ES-B-2396

g. Noise Suppressor Test Set-Up as per ES-A-5605

h. Audio Oscillator, General Radio Co. type 508-A, or equal

i. RCA Crystal Calibrator, type TMV 133A, or equal

j. Heterodyne type frequency meter, equipped with a crystal calibrator and having an accuracy of at least .02 per cent

k. Electron Frequency Meter GR type 834A, or equal

l. Oscillograph RCA Mfg. Company type TMW 122-B, or equal

m. Shielded Phantom Antennas, 5 mu mu f, 50 mu mu f, to fit antenna post of receiver

n. Resistor, 300-ohm, for intermediate frequency alignment

o. Headsets, Western Electric 509 W, or equal, with suitable plugs

p. GO and NOT GO thread gages for checking the male screw threads of Socket SO-94. These gages shall be designed to check the assembled socket on the receiver.

q. GO and NOT GO thread gages for checking the male screw thread of the shielded binding post

r. GO and NOT GO plug gages for checking the reamed hole in Jack JK-33-A.

s. GO and NOT GO plug gages for checking the reamed hole in Jack JK-34-A.

(2) 17 Aug 43 15 Oct 43

F-4. Each radio receiver shall be tested for compliance with the performance and adjustment requirements given on Drawings SC-D-2738 and SC-D-2740. The performance shall be tested at all points which are indicated by double check marks on the drawings listed above. Performance shall be in all cases within the manufacturing tolerances shown on these drawings.

F-5. The inspector shall ascertain that all terminations such as power plugs and jacks are correctly wired, and that the antenna relay and band switches operate properly. Socket SO-94, the shielded binding posts and the jacks of each radio receiver shall be checked by means of the GO and NOT GO gages listed in Paragraph F-3. Each radio receiver shall be tested for compliance with the requirements of Paragraph E-4.

F-6. Salt-Water Immersion Test. This test shall be performed on the sample dynamotor case submitted for approval. The specimen undergoing test shall be immersed in a saturated salt-water solution for 24 hours and then allowed to dry for 24 hours in a room under ordinary conditions of temperature and humidity. The specimen shall show no evidence of corrosion after completion of the test. For similar test on the box of Rectifier RA-20 see Specification No. 71-945.

F-7. Test for Proper Application of Paint. At the discretion of the inspector, painted surfaces of several sample equipments, selected from production, shall be checked for the satisfactory application of paint by testing the adhesion of the paint film. The test shall be made after the paint has been dried or baked for the specified time interval, (see Specification TAC ES-No. 680) and shall consist of scraping the painted surface with a knife edge held at an angle of 30 degrees from the film. The film shall not chip, flake, nor be cut clean from the surface. The knife shall cut gradually through the film in the form of a sloping channel.

G. PACKAGING, PACKING AND MARKING

G-1. Packaging. Each radio receiver with tubes inserted in their sockets shall be packaged in a separate fiberboard carton so designed as to provide adequate protection. Each carton shall be marked or labeled with name and type number of radio receiver, order number, (usually given on the contract as file number), and name of contractor.

G-1a. Knob stud, per Drawing SC-A-1559, shall be carried in a cloth bag, and the cloth bag shall be attached to one of the handles of the receiver.

(2) 11-24-43 150-43

G-2. Packing. Consignments shall be prepared for either domestic or export shipment, as specified by the contracting officer, in such a manner that they will reach destination in a satisfactory condition. Consignments specified for domestic shipment shall be packed in such a manner as to be capable of being safely reshipped from their original destination to any point within the continental limits of the United States without repacking or reinforcing.

G-3. Marking. Shipments shall be marked in accordance with U. S. Army Specification 100-2.

H. NOTES

H-1. If due to this revised specification it becomes necessary for a contractor, who is manufacturing this equipment on previous contracts, to change tools, retool, or modify established assembly lines, thereby causing a delay in delivery, the contractor should immediately so inform the contracting officer.

H-2. The use of this specification, whenever applicable, is mandatory on all procuring agencies of the Army.

H-3. Notice. When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility or any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use or sell any patented invention that may in any way be related thereto.

H-4. It is to be understood that the contractor will bear all of the following expenses;

a. Cost of transportation of samples to and from the point where tests are to be made. (See Paragraph D-1).

b. Any damage to submitted samples resulting from testing, or from assembling or disassembling. (See Paragraph D-1).

c. Cost of packing the equipment. (See Paragraph G-2).

H-5. Copies of this specification may be obtained from the Philadelphia Signal Corps Procurement District, 5000 Wissahickon Avenue, Philadelphia, Pa. However, copies of specifications to be used for the purpose of bidding or manufacture should be obtained from the contracting officer or the firm soliciting bids.

(2) 11-24-43 15 Oct 43